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The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XLVII
No. 1218

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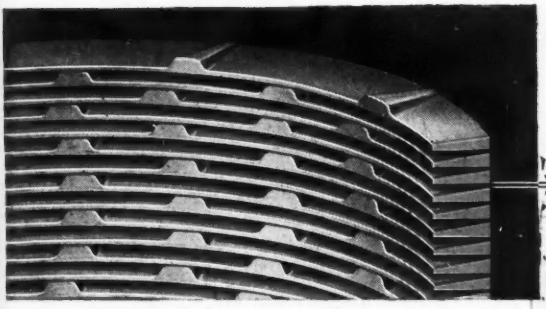

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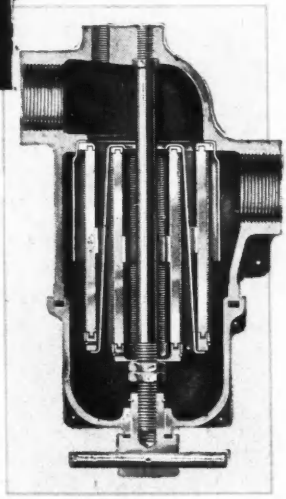

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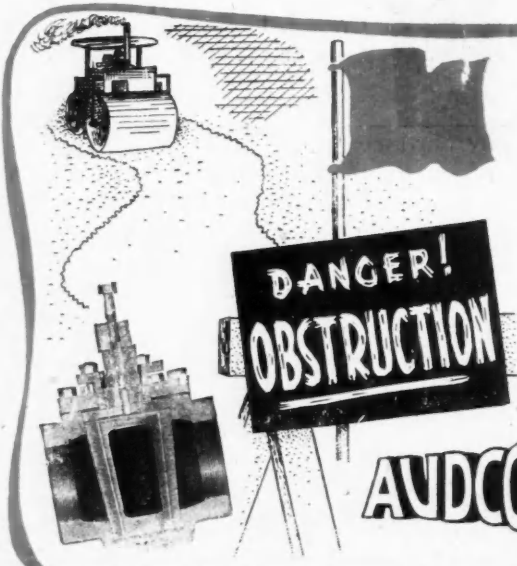

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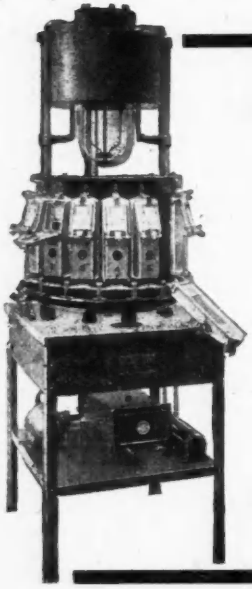

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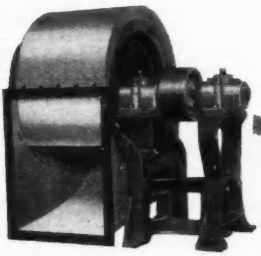

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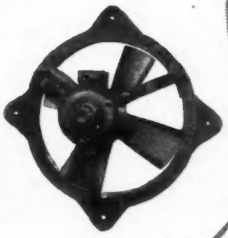

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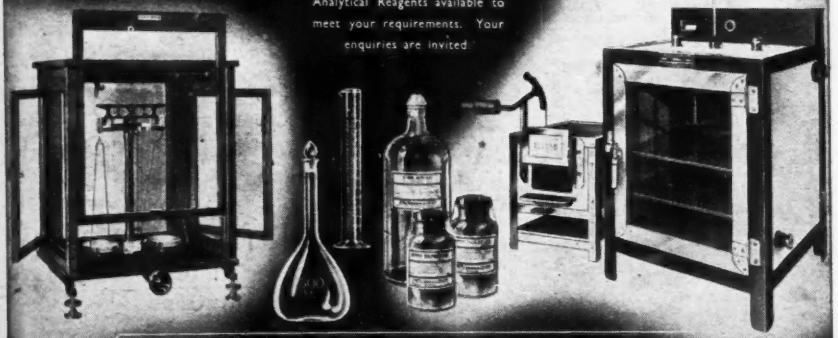

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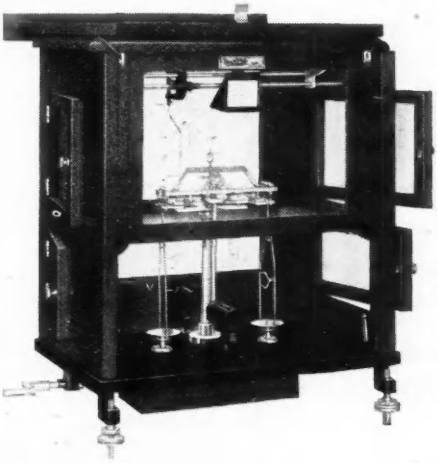

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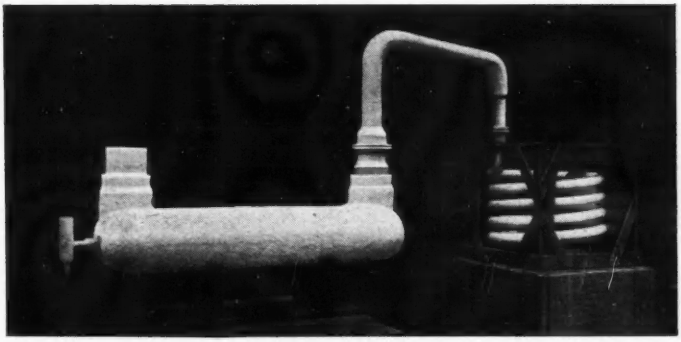

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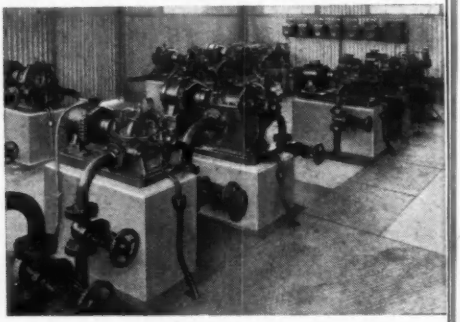

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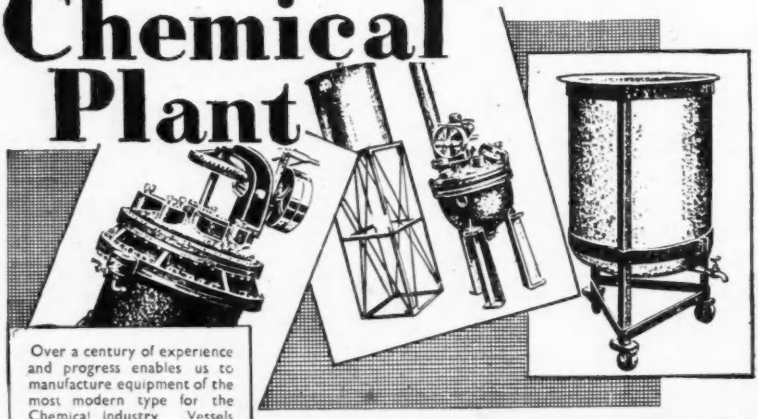

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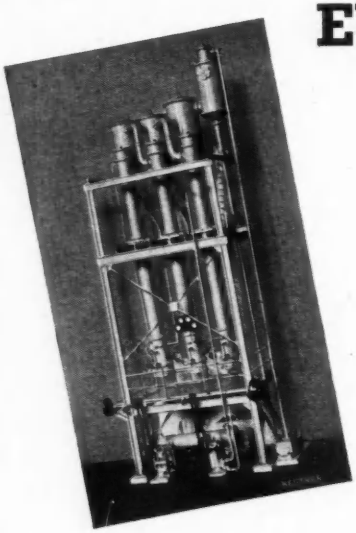

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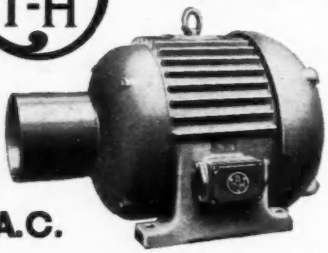

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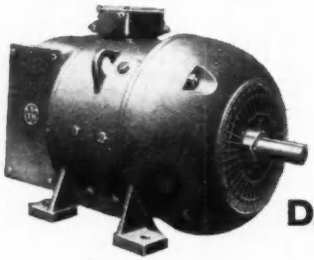

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Nutrition Policy

AMONG the more striking manifestations of the power of chemistry has been the immensely increased interest in food and its problems. The Food Group is perhaps the most active group in the Society of Chemical Industry, and in the daily Press, food and the problems of nutrition receive more reference than any other single subject of scientific interest. One result of the great amount of work that has been done in this field in this country is that, in spite of three rather disastrous years in which many of our principal sources of food supply have been lost to us and during which our supplies have been subject to constant attack, Great Britain remains the best-fed country in Europe. It is true that the pronouncements of food experts have sometimes during this period appeared to savour of opportunism. Whenever circumstances have made it desirable that the nation should change its food habits, it has always seemed possible for the authorities to find a so-called expert who is prepared to announce that the food that we have been eating is not really well suited to us, but that another food which happens to be plentiful and which previously has been despised is really very much better. The pronouncements of such food "experts," particularly during the early part of the war, have sometimes appeared to be sadly contradictory.

Whatever may be the present food difficulties, it is certain that after the war the subject of nutrition will have to be taken in hand thoroughly. There are too many examples known of well-fed people dying of starvation because the food they eat is not nourishing. There are many substances present in certain foods, including among others the various vitamins about which we require to know more, and of which certain quantities appear to be necessary for a nourishing diet. Large areas of the world will be very much under-nourished, as has always been the case, and this will be accentuated by the war. In the East of Europe, for instance, there is an area inhabited by over 100 million people of whom 70 million are engaged in the production of food; within that area the great mass of people suffer from malnutrition due to an excess of cereals and a deficiency of animal products, fruit, and vegetables. It has been stated that all post-war problems of unemployment would be solved if the standard of nutrition of the vast millions who comprise the backward nations could be raised by

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even a small amount. It is proposed to investigate this subject by setting up a Nutrition Council to undertake the work now done by a great number of committees and other authorities who are at present operating without any common plan or any effective co-ordination with one another. Who should be responsible for this work is still a subject of dispute.

There are those who advocate that the work should be turned over to the Medical Research Council on the ground that, fundamentally, the ultimate effects of nutrition must be medical, and that the Medical Research Council has very much wider functions than those of pure medical research. It has been pointed out that of the Council's varied scientific staff 60 per cent. have no medical qualifications, and the staff of the Council are accustomed to conducting researches in co-operation with scientists from many branches. As against this view it has been indicated that the funds at the disposal of the Medical Research Council are nothing like large enough to enable this additional work to be put upon it; that is an objection which, of course, could easily be removed if the Government decided to back the formation of a Nutrition Council. Mr. Bacharach has raised the more fundamental objection that much nutritional investigation calls for no medical training, and that the three main tasks of any nutritional council—the collation and spreading of existing knowledge, the co-ordination of current investigation, and the planning of future research—could not be directed by an entirely medical body. Mr. Bacharach indeed gives a very comprehensive list of the scientific men required for comprehensive nutritional research.

In fundamental work on essential nutrients—vitamins, amino-acids, trace metals, for example—many and various specialists are required, and none of them needs to have been in medical practice; indeed, few, if any, need to have had a medical training, and it is doubtful whether they would have had time for training in both medicine and their own highly skilled department. The pharmacologist, the chemical analyst, the biological assayer, the spectroscopist, each plays an essential rôle here: similarly, in the application of nutritional knowledge to problems of producing, processing, transporting, and cooking food, the trained services of the chemical and mechanical engineer, agronomist (including botanist and zoologist), diet expert, economist, and statistician are needed, whereas the function of the medical man is, as for the fundamental research, to indicate the directions in which progress is most urgently needed. It is between the fields of the laboratory worker and the technologist, in the second and central part of nutritional research, that medicine must play a dominant part, in those problems that are concerned with nutritional disorders and diseases. Here the general clinician, the pathologist, the pædiatrist, the gynæcologist, the dentist, and many others will wish to pool their knowledge and plan joint attacks on unsolved problems. They will, however, even here need the assistance of non-medical scientists (to say nothing of the veterinarians) such as chemists, economists, statisticians, and anthropologists.

Who should direct and control the work of a nutritional council is the first problem to be settled. Our view would be that a man of first-class qualifications should be appointed as director for the work if only because an individual will get things done very much better than a committee; but that he should have behind him a strong nutritional council representative of as many as possible of the sciences and professions listed by Mr. Bacharach. It seems probable that the first need of a nutritional council is to co-ordinate the vast amount of work that is being done in many parts of the world. It could arrange for work to be done by specialists without itself employing a large staff on investigational work. The problem is important because food is the first necessity of life and there can be no security for an enduring peace so long as large masses of people are condemned to live on the verge of starvation.

The first step would seem to be the application of existing knowledge. The gulf between research and its use has been a common failure not only in nutrition, but in nearly every problem in every walk of life. It is therefore necessary for us first to collate existing knowledge, then to apply it, and then to decide in what directions an extension of knowledge is necessary. There is plenty of first-class work before a nutritional council and it is to be hoped that the project will be brought to fruition.

NOTES AND COMMENTS

Soil Pollution

CONSIDERING the amount of trouble and skill (not to mention costs at law) that have been expended in abolishing, or at any rate minimising as far as possible, the pollution of the air and of running water by the waste products of industry, it is surprising how little has been done in a similar direction to stop industrial spoliation and sterilisation of the soil. A few flower-beds, it is true, have been laid out on the slag-heaps of Brynmawr, but that was a private and isolated effort, unsupported by statute, and only came into play after industry has decided that the district offered no further prospect, financially speaking. Many other areas in Great Britain, now abandoned, have felt the searing breath of industry and remain useless for ever, as a monument to the callous opportunism of a get-rich-quick epoch. Now that the importance of the soil as a means of national salvation in time of stress has once more been rudely forced on our attention, it is surely time to act with a view to preventing further wastage of its fertility.

A Job for the Planners

FOR some time past, a correspondence has been going on in *The Times* concerning the ruin of fertile acres in Northamptonshire by the comparatively new iron-mining industry established there. The miners extract the ironstone, leave behind them huge parallel ridges of upturned rubble, and pass on. They have paid for the land, why should they not destroy it? There is no law to prevent them. No desolation need have been occasioned if the land had been levelled and resown as ore-working proceeded, but that would have added to the cost of the working, and apparently no provision against harmful treatment of the land was laid down in the original contracts. Sir John Russell, in the contribution he has made to the correspondence, hits the nail on the head as usual: "The agricultural owner," he writes, "recognises that he is only a trustee, that he must hand on the land . . . improved if possible, but certainly not worsened by his activities. . . . But the industrial user of the land has no such feeling of responsibility to the future . . . he feels he is entitled to destroy it for ever if it suits his purpose." Rothamsted examined the problem before the war and was confronted by the "insuperable difficulty" that the cost of levelling the land was greater than its agricultural value *at the time*. We have italicised these last words, which epitomise the selfish and myopic view of pre-war authority and of some sections of industry. Here is meat for the planners to get their teeth into.

Non-Ferrous Facts

TO speed up the supply of non-ferrous metals and to save as much shipping as possible, the Ministry of Supply has issued an urgent appeal for all unwanted copper, zinc, lead, pewter, white metal, brass, bronze, and aluminium. Engineering firms, including chemical engineers, can do much to help in this campaign, as the required metals are all used in the apparatus of their trade. They are earnestly requested to search out all unwanted or unusable articles such as copper cable, electrical parts and fittings, wire turnings; zinc sheet, turnings, lead-covered cable, pipe, sheet, plumbers' jointings; bronze bearings, bushes, cocks, crown wheels, couplings, valves, etc., brass pipe, sheet, tube, turnings; white metal, anti-friction metal, solder waste; aluminium (and its alloys), pipe, sheet, tube, turnings. Copper, lead, zinc, tin are needed urgently in our war factories and shipbuilding yards. They are wanted for numerous vitally important uses in both pure and alloyed forms. In a battleship there are no less than 2,000,000 lb. of copper, brass is used for switches, compasses, and navigating equipment; dials, gunsights, and propellers are made from bronze; large quantities of zinc and brass go into shell and cartridge cases. There are two miles of copper wire in a bomber, as well as brass for instruments, aluminium for fuselage and fittings, and anti-friction metal for engine bearings. The production of equipment for the Fighting Services generally demands thousands of tons of these metals—but it's a long way to those mines on the other side of the Atlantic and Indian Oceans.

Preclusive Buying

AN amusing example of how the United States Board of Economic Warfare does its work is given by a

writer in the *Yorkshire Post*. An Italian business man in Latin America, who was an agent for his Government, went to a broker he had dealt with many times before and placed an order for industrial diamonds, very much in demand by every belligerent nation. He was told that the supply of diamonds was exhausted. He could not believe it. Only a few days before he had made a purchase from the same broker and there was a large supply of diamonds on hand. But it was true. The United States, through its Board of Economic Warfare had stepped in and purchased the entire supply. The Board calls this "preclusive buying." It is one of its most important functions, says the writer.

Directing Economic Attacks

ANOTHER division of the Board is the Office of Exports which prevents the export of any materials needed in the country or of any materials which if exported might fall into the hands of the enemy. Nothing to-day can be exported from the United States without a licence from B.E.W., and it receives 6000 or more licence applications daily. A division of the organisation which is surrounded with some mystery is the Office of Economic Warfare Analysis. This office works in conjunction with the British Ministry of Economic Warfare. It makes detailed studies of the economic and industrial strength and weakness of every country with which the United Nations are at war. Using this information, air raids can be directed to best advantage by the War Department, or other strategic moves planned.

Metallurgical Films

THE instructional film for purposes of industrial training has come into its own in America. The Director of the U.S. Bureau of Mines has announced that an audience of more than ten million had attended the showings of the Bureau's films during the past twelve months, and that an increase of at least 10 per cent. was expected during the coming year. Mining and metallurgy, naturally, supply many subjects spectacular enough to "carry" an instructional film, and full advantage has been taken of this. Such titles as "The Making and Shaping of Steel," "Nickel High-Lights," and "The Story of Petroleum" tell their own tale.

General Smuts and Science

OUR ready response to one paragraph in General Smuts's address to Parliament had nothing to do with politics. It was at the point where he borrowed the idiom of the chemist to emphasise his estimate of the place of Pearl Harbour in the war. It was, he said, a catalyser. "It suddenly crystallised, precipitated, and solidified American opinion as nothing else in the world could have done." It seemed at first an unusual figure for a man whose background was legal—he was a Bencher of the Middle Temple and practised at the Cape Town Bar—rather than scientific. The phrase served, however, to remind us that General Smuts has had at least one important tie with the scientific world. Just over eleven years ago—on September 23, 1931, in fact—he was elected to the Presidency of the British Association. The occasion marked the centenary of the Association and, in a short address on taking the chair, General Smuts said: "One may hesitate about the next step in political development, but there is no room for doubt that science, now even more than in 1831, is the dominant feature in the industrial and economic revival." He might, we feel, have repeated those words the other day without fear of their having lost any of their truth for the post-war world.

The World-Picture

GENERAL SMUTS'S main presidential address was delivered in the evening of September 23, 1931. The subject was "The Scientific World-Picture of To-day" and modern science was called in to ensure that as many people who wished could hear it. It was relayed to three halls in Westminster, it was broadcast, and part of it was recorded. After a careful survey of the various fields of science, he followed his conclusions with the warning that even if the world picture to which science seemed to him to be pointing was generally accepted, "we have still to bear in mind that the world picture of tomorrow will in all probability be very different from any which can be sketched to-day." It is doubtful whether even General Smuts, with the prescience exhibited on that occasion, could have foretold the events which led up to the delivery of the next great speech he was to make on this soil.

Nitroparaffins as Solvents*

War-Time Developments of Industrial Importance

THE commercial production of four nitroparaffins—nitromethane, nitroethane, and 1- and 2-nitropropanes—was started in the summer of 1940. Since that time they have become of considerable importance in the chemical industry. The present paper will be limited to considering certain of the solvent uses of the nitroparaffins. Organic liquids find use as solvents in two large fields: the extraction of various materials by selective-solvent action, and the dissolving of materials to aid in carrying out reactions or to produce desired effects such as the deposition of films of protective coatings. In any of these applications the physical properties of the solvent are important.

Some Physical Properties

The nitroparaffins belong to the medium-boiling class of solvents, and their rates of evaporation lie between those of toluene and butyl acetate. They are not hygroscopic, and these materials and water have very low mutual solubilities. Taking butyl acetate as 100, the evaporation rates of various nitroparaffins and lacquer solvents can be compared as follows: acetone 720, ethyl acetate 525, dioxane 215, ethyl alcohol 203, toluene 195, nitromethane 180, nitroethane 145, 2-nitropropane 124, 1-nitropropane 100, methyl cellulose 55, butyl alcohol 45, ethyl lactate 22, diacetone alcohol 15.

Although the nitroparaffins contain both nitrogen and oxygen—a combination often associated with explosives and other highly inflammable compounds—their flash points show that they are less inflammable than the common hydrocarbons, ketones, and esters of similar evaporation rate. Unsuccessful attempts have been made to cause the nitroparaffins to explode with detonating caps. A detailed study has been made of the toxicity of the nitroparaffins, and in this respect they are similar to the ester-type solvents of approximately equal vapour pressure. They, therefore, offer no unusual hazards, either with respect to toxicity or fire risk. The ordinary precautions exercised in handling the common lacquer solvents are sufficient for the nitroparaffins. While 1- and 2-nitropropane are miscible with petroleum naphtha, nitromethane is immiscible with even low-boiling petroleum hydrocarbons, and the miscibility of nitroethane depends on the boiling range of the hydrocarbon. Because of these differences, it is logical to look for the use of the nitroparaffins as selective solvents in the petroleum industry, and developments of considerable magnitude have been forthcoming. The use of the nitroparaffins by the coating industry is, perhaps, of even greater interest.

Cellulose acetate has been known for many years, and at one time was thought to be potentially the most useful of the various cellulose derivatives. It failed to fulfil its original promise as a protective coating because of the lack of suitable solvents, plasticisers, and compatible resins. As a result, investigation of other cellulose esters has been pursued extensively. The outstanding development in the field of cellulose esters has been the production of mixed cellulose acetobutyrates. The most important member of this series is probably the derivative containing twice as much acetyl (CH_3CO) as butyl (C_3H_7CO). This material is superior to nitrocellulose in that it offers no fire hazard, and it is superior to cellulose acetate in water resistance and solubility in various organic solvents. The resistance of cellulose acetobutyrate to sunlight and to ultra-violet light makes it an excellent material for use in exterior coating compositions.

Solvent Evaporation Problems

Before the development of the nitroparaffins, no solvents were available that would contribute to cellulose organic ester coatings the characteristics given by butyl acetate to nitrocellulose lacquers. For example, a typical solvent mixture of the following composition has been used in cellulose acetobutyrate coatings: diacetone 15 per cent., ethyl acetate 35, acetone 30, toluene 20. The rapid evaporation of the acetone and the ethyl acetate from such formulas tends to gel the film before it has a chance to flow out, and at the same time sufficient cooling is produced to cause an undesirable condensation of moisture on the film. On the other hand, the very slow evaporation of the diacetone tends to keep the film soft for an extended period.

The four nitroparaffins evaporate in the approximate range of butyl acetate, 1-nitropropane having exactly the same rate of evaporation as the normal ester. Nitromethane, the fastest evaporating of the group, is similar to toluene in its rate of evaporation. All these materials are solvents for cellulose acetobutyrate of the grade specified in the preceding paragraph; however, owing to the limited supply of nitromethane and nitroethane, experimental work on the nitroparaffins as solvents for cellulose acetobutyrate has been restricted to 1- and 2-nitropropanes. A grade of cellulose acetobutyrate which meets the above specifications has been studied extensively; while there are less well-defined grades available

* From a paper by Charles Bogin and H. L. Wampner (*Ind. Eng. Chem.*, 1942, **34**, 9, p. 1091), presented to the American Chemical Society.

which differ slightly in performance from this product. Combinations of alcohol and toluene, both of which might be normally considered diluents for solutions of cellulose acetobutyrate in a true solvent, actually contribute to the solvent power of the nitropropanes. Thus, 1-nitropropane solvent mixtures containing 60 per cent. by volume of ethyl alcohol or 30 per cent. by volume of toluene do not dissolve cellulose acetobutyrate, whereas a 1-nitropropane solvent containing 75 per cent. of a 50:50 mixture of ethyl alcohol and toluene works satisfactorily.

The tolerance or dilution ratio of cellulose acetobutyrate solutions in 1-nitropropane for ethyl alcohol is 3.3 and for toluene is 2.1; but for a mixture of ethyl alcohol and toluene it is several times as high as for either separately. Butanol has a somewhat greater precipitating power than ethyl alcohol and is, therefore, more of a diluent; however, the well-known anti-blush characteristics of butanol make it a worth-while constituent of solvent mixtures. One of the chief drawbacks to the development of cellulose acetate lacquers has been the dearth of suitable resins and plasticisers. This difficulty has not been so serious with cellulose acetobutyrate, since it is compatible with many of the common nitrocellulose plasticisers, and suitable formulations also permit the incorporation of some of the resins which are frequently used with nitrocellulose.

Coatings

Coatings are often sold commercially as concentrated stocks to be diluted with a thinner by the user. For ease of solution and for stability, it is desirable to prepare such concentrated stocks with solutions rich in nitropropanes. This can then be diluted with a thinner that is poor in nitropropanes so that the final solution has the composition selected by the manufacturer as most suitable to his purposes.

The grades of cellulose acetate generally used in coatings consist of partially hydrolysed materials. Often about 2.5 acetyl radicals are present per glucose residue, whereas theoretically 3.0 are possible. This hydrolysis of the cellulose acetate increases the solubility of the final product, but at the same time it increases its sensitivity to water. As a result, there has been some tendency within recent years to use a cellulose triacetate grade, which approaches the theoretical acetyl content. For the partially hydrolysed type of cellulose acetate, a typical and commonly used solvent formula is the following: acetone 35 per cent., ethyl acetate 15, methyl ethyl ketone 35, ethyl lactate 15. This is similar in type to the formula specified above for cellulose acteobutyrate. It is now possible through the use of nitroparaffin solvent mixtures to produce compositions which approach the ideal in rate of evaporation instead of the unbalanced mixtures formerly used. As with cellulose acetobutyrate, the solubility depends on the mixture of alcohol and diluents used with the nitroparaffins. One difference exists, however. The nitroparaffins, with the exception of nitromethane, are not true solvents for the usual grades of cellulose acetate, but require the presence of small proportions of alcohol to activate them. Furthermore, the proper ratio of alcohol to nitroparaffin must exist during the entire drying of the composition. Because of this requirement, the formulation of solvent mixtures for cellulose acetate is more critical than for cellulose acetobutyrate. The desired effect is achieved by using mixtures of alcohols. With 1- and 2-nitropropane a mixture of butanol and ethanol in equal proportions is satisfactory. However, since alcohols form constant-evaporating mixtures with hydrocarbons, the exact ratio of ethanol to butanol may vary somewhat, depending on the hydrocarbon used.

Toleration of Diluents

Solutions of cellulose acetate in the proper mixtures of nitroparaffins and alcohols will tolerate quite large proportions of hydrocarbon diluents. It has been found, however, in the preparation of stock lacquers, with mixed solvents that there is some tendency toward gelling when concentrated stocks are prepared in mixtures containing high proportions of hydrocarbons. This gelling is not encountered if the proportion of hydrocarbon is reduced below the proportion that can be used to produce normal spraying viscosities. The solvent mixtures used in preparing concentrated stock solutions of cellulose acetate should, therefore, be rich in nitroparaffins. Such stocks can be diluted with a thinner which is poor in nitroparaffins, so that the desired solvent composition is obtained in the final lacquer. This parallels the recommended procedure for cellulose acetobutyrate. The use of nitroparaffin solvent mixtures does not change the resin compatibility of cellulose acetate to any great degree. The most noticeable effect has been to increase the quantity of resin that can be used rather than to enlarge the selection of compatible resins. Santolite MS and MHP are compatible with cellulose acetate, and Rezyl 14 and Bakelite resins 4357 and 3180 show some compatibility. The usable proportions of the last three resins are substantially higher with nitroparaffin solvent mixtures than with the common mixtures containing acetone and ethyl acetate. As with cellulose acetobutyrate, resins which are themselves compatible with cellulose acetate have some power to improve the compatibility of less compatible resins.

The development of cellulose triacetate as a coating material has been seriously impeded by a lack of suitable solvents. The only

materials that have been available for use with the triacetate are the chlorinated hydrocarbons, which, unfortunately, are both corrosive and toxic. However, since the degree of toxicity depends on the proportion of toxic substance present in the solvent vapours, it has been found possible to use the chlorinated compounds by reducing their concentration in the solvent mixtures. To accomplish this reduction, the nitropropanes have been found especially suitable; for although the nitropropanes themselves are not true solvents for cellulose triacetate, mixtures of the nitropropanes with a small proportion of chlorinated hydrocarbon have been found to be good solvents, and satisfactory films are deposited by the resulting solutions.

Cellulose acetopropionate was developed to supply the need for a grade of cellulose mixed esters which would be soluble in cellulose lacquers solvents, such as esters and ketones. However, the proportion of these materials which must be used with cellulose acetapropionate is higher than with cellulose nitrate. The strong solvent power of the nitroparaffins for such cellulose mixed esters is evidenced by the high proportions of diluents that can be used. It has been observed that the usable solvent formulas for depositing films from cellulose acetopropionate dissolved in the nitroparaffins may contain more diluents than are sometimes found in nitrocellulose lacquers made with ester-type solvents. Nitropropane solvent mixtures produce cellulose acetopropionate solutions of lower viscosity than

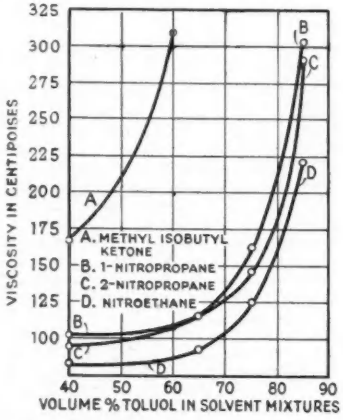


Fig. 1. Viscosities of cellulose acetopropionate solutions (solids concentration 8 g./100 ml. of solvent).

ester-type solvents. This effect is shown graphically in Fig. 1.

The nitroparaffins are also strong solvents for nitrocellulose and cellulose ethers. For most uses, however, they offer no economical advantage over the more common solvents,

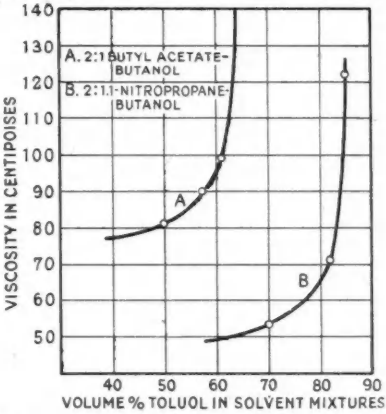


Fig. 2. Viscosities of Solutions of Vinylite, grade VYHF (concentration of Vinylite in all solutions, 18 g./100 ml. of solvent).

and, therefore, the use of nitroparaffins is generally restricted to those applications where the specific properties of the nitroparaffins are required. A number of special applications have been developed taking advantage of the fact that they have a mild odour, are water-insoluble, and impart certain characteristics to the finished product which cannot be obtained with more common solvents.

In recent years the number of synthetic polymers of interest as coating materials has increased considerably. Several are already being used in large amounts. With the ever-increasing number of these compounds, most of which exist in several modifications, it is impossible in an article of this scope to give detailed results on each individual. A few examples have, therefore, been selected to illustrate the strong solvent power of the nitroparaffins for these new materials.

The copolymerisation of vinyl chloride and vinyl acetate yields a series of resins which are being utilised in large volumes for protective coatings, especially as can liners. The most common of these materials is the product containing approximately 85-87 per cent. of the chloride. The small amount of the acetate present improves the solubility of the product. The nitroparaffins are among the most powerful solvents for such vinyl copolymer resins. Some idea of the solvent power of the nitroparaffins in comparison with methyl isobutyl ketone, which is often used in making solutions of the vinyl copolymer, is given in Fig. 2. At a given solids content and viscosity, much more

hydrocarbon diluent can be used with the nitroparaffins than with the ketone. While Fig. 2 shows results for only one grade of Vinylite, parallel results have been found for other grades. The unusual properties of the acetals of polyvinyl alcohol have found widespread application for these materials. As an illustration of the solvent power of the nitroparaffins, it has been found that the polyvinyl formal sold under the name of Formvar can be dissolved in mixtures of the nitroparaffins and ethanol.

The use of solutions of synthetic rubber as cements and impregnating media is becoming of considerable importance. It has been found that the nitroparaffins are true solvents for synthetic rubbers such as Hycar OR, and are slower evaporating and far less toxic than the chlorinated hydrocarbons, which are the only other materials of comparable solvent power. Solutions of Hycar in the nitroparaffins have high tolerances for aromatic hydrocarbons. The use of the nitroparaffins does not eliminate the necessity for milling the polymer, but there is less tendency for the prepared solution to gel when these solvents are used. The nitroparaffins and certain derivatives are also useful in cements made of natural rubber.

Owing to the decreased availability of aromatic solvents at present, the replacement of these materials with aliphatic hydrocarbons is of great interest. For certain alkyd resins which are normally insoluble in petroleum naphthas, mixtures of butanol and naphtha for partial replacement of the aromatic solvent have been suggested. The objection to totally replacing the aromatic, however, is that butanol itself, or its combination with naphtha, is not a solvent for many resins. If the nitroparaffins are used in the mixture to replace part or all of the butanol, a much higher proportion of the aromatic solvent can be replaced without sacrificing either solids content, viscosity, or performance. The nitroparaffins also contribute to the performance of paint and varnish removers. For example, the use of 20 per cent. nitroethane or 2-nitropropane in the familiar benzene-acetone-alcohol type of remover produces a satisfactory attack on finishes which are otherwise little affected. Such improved varnish removers are of special interest for stripping baked alkyd or urea-formaldehyde finishes.

A Sumach Substitute from Wattle*

by T. WOODHEAD, B.Sc., Rhodes University College

SUMACH is used by many heavy-leather tanners as a scouring and cleaning agent after tannage and is very satisfactory in this respect. Owing to the difficulty of obtaining further supplies of this material a substitute was desirable and the following experiments were carried out with this in view. The leather under test was taken from the final tan liquor without hot pitting and the tannage was solely wattle extract.

Myrabs is a light-coloured pyrogallol tannin and this was tried first. Five per cent. of the solid extract on the weight of the leather was used and dissolved to give a liquor of 90° Bk. in which the leather was drummed for two hours. After drumming, the pieces were rinsed in water, allowed to drain 30 minutes, oiled off with sulphonated cod oil and dried in a dark room. At the same time comparison samples were treated with ground sumach leaves, using ten per cent. on the leather weight, as the solid myrab extract contains approximately twice the amount of tannin as the sumach. When dry the sumach-treated pieces were a much brighter colour than those treated with myrabs, the latter being little better than samples receiving no after treatment.

Sulphited quebracho was next tried and five per cent. of the solid extract on the weight of leather used. This improved the colour somewhat but was not quite so good as sumach and certainly had not the same scouring effect. To improve the scouring a further experiment was carried out using a mixture of 50 parts sulphited quebracho and 50 parts wood dust. Ten per cent. of this mixture was used so that the same quantity of actual extract was employed. This produced a leather with a very similar appearance to that obtained with sumach, but the colour, although brightened, was still rather pinkish and lacked the yellow produced by the sumach. As considerable bleaching properties had been obtained by treating wattle extract with sodium hydrosulphite, an experiment was carried out using these substances in the following proportions: 50 parts wattle extract (solid); 50 parts wood dust (obtained from a sanding machine); 3 parts sodium hydrosulphite. Ten per cent. of this mixture was used and the leather treated exactly as before.

This gave remarkable results and the leather was even lighter in colour than the sumach-treated pieces and had lost all the pink shade. The mixture is simply prepared and the three component substances can be ground together, or the wattle extract and sodium hydrosulphite dissolved and the sawdust added.

* From an article in the Official Journal of the South African Department of Commerce and Industries, August, 1942.

Ventilation

Solving the Black-out Problem

IN the recently issued booklet on "The Problem of Absenteeism," produced by the Ministry of Labour and National Service, one of the prime causes of absenteeism is stated to be that "workers in a permanently blacked-out factory complain that they get a feeling of depression owing to absence of sunlight; they are also inclined to feel that proper ventilation is lacking because they do not feel the movement of air on their faces." Other workers, particularly new women recruits unaccustomed to factory conditions, complain that their output suffers because of high temperatures in many workshops. It has been fully demonstrated that these "feelings," vague and perhaps baseless though they may be, are a factor that must be considered when dealing with the human element.

Moreover, vast quantities of fuel are wasted daily in providing electric light for permanently blacked-out shops and workrooms; and these lights, where there is no adequate ventilation, make the rooms hot. The heat of the sun, beating on metal roofs which have been substituted for glass, is another cause of excessive temperature, affecting both the health and the output of the operatives, and requiring special ventilation to counteract it.

The question of ventilation, then, is seen to be one of primary importance in wartime industry, and accordingly Colt Ventilation, Ltd., have, since early in 1940, been spending their energies in devising more and more efficient systems of industrial ventilation. After 2½ years of experiment, they claim to have produced a completely new thought in ventilation, that is to say, that by the scientific analysis of existing conditions, they are now able to establish a prescribed number of air changes per hour, according to the industry concerned, within the limits of natural ventilation.

The Colt System of Ventilation depends upon the dominant physical law of convection, the air currents set up by which, if properly understood, can be harnessed, controlled, and directed. The function of their system of black-out ventilation is to enable the existing ventilation, whatever it may be (except air conditioning) to operate properly after dark, or to provide an adequate system of night ventilation.

Fig. 1. The Colt "P.R." Ventilator in position on a corrugated roof.

The Colt "P.R." Ventilator has taken two years to develop. Among outstanding advantages claimed for it are that it is completely light-tight, and completely weatherproof on any pitch of roof; that it extracts continuously, whatever the direction of the wind; and that, being only three inches deep, it can conform to any proposed or existing camouflage scheme. It can be fitted to any type of roof, or between glazing bars. A sectional diagram is shown in Fig. 2, and a ventilator actually in place on a corrugated roof is seen in Fig. 1. The Colt "Northlight" Ventilator is a type notable for economy in cost of fitting; it is supplied in standard lengths (special sizes when required) and incorporates a rain guard giving protection on all pitches down to 55 degrees.

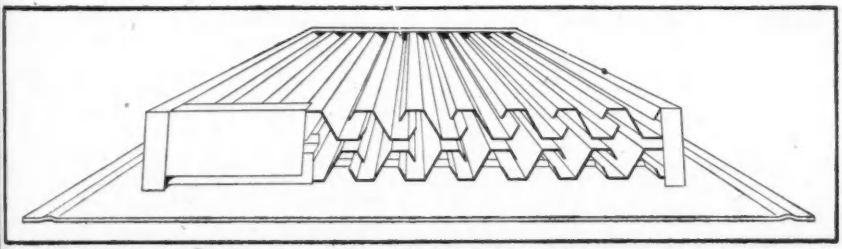


Fig. 2. Sectional Perspective of the Colt "P.R." Ventilator, showing freedom of air-flow, complete trapping of light, and 100 per cent. weatherproof design.

Personal Notes

MR. J. S. ADDISON has been elected deputy-chairman of Courtaulds, Ltd., in place of the late Mr. Stanley Bourne. He will continue to hold the office of managing director.

MR. W. K. HUTCHINSON, staff chemist at the Fulham research laboratory of The Gas Light and Coke Company, has been appointed Director of Hydrogen Production in succession to Major the Viscount Ridley.

MR. C. S. GARLAND and MR. F. M. POTTER have been appointed to serve on the Finance Committee of the Society of Chemical Industry. Mr. Garland has also been selected as the Society's representative on the Chemical Council for one year.

MR. THEODORE ASHLEY, O.B.E., Divisional Inspector of Mines and Quarries in Scotland since 1937, has retired from the staff of the Ministry of Fuel and Power on reaching the age limit. He was appointed an assistant inspector in 1911 and before coming to Scotland was Divisional Inspector in the Swansea Division. He was a member of the board for mining examinations and of the council of the Mining Institute of Scotland.

Obituary

As briefly announced in our issue of last week, MR. HORACE BROADBENT, chairman and until recently managing director of

Mr. Horace Broadbent.

Thomas Broadbent and Sons, Ltd., Central Ironworks, Huddersfield, died on October 20, aged 79. Mr. Broadbent was one of the country's leading authorities on centrifugal machines, and had been actively associated with the firm until his illness of about twelve months ago. His loss will be felt for a long time by a wide circle of business and personal friends.

Horace Broadbent was the second son of the late Thomas Broadbent, the founder of the firm which bears his name, and, after an education at Mellor's Academy and the Huddersfield College, he began work as an apprentice to his father in 1878. He became a partner in 1884 and a director in 1895 upon the reconstruction of the company. He was a pioneer in the development of hydro-extractors and electric cranes, and the patentee of many revolutionary improvements in the design of centrifugal machinery. His firm were the first makers of direct steam-driven hydro-extractors, direct electrically-driven hydro-extractors, and of electric overhead travelling cranes.

Besides active association with the public life of the town in which he lived and worked, Mr. Broadbent was a member of the British Chemical Plant Manufacturers' Association, of the Institution of Chemical Engineers, of the Society of Chemical Industry, and of the Iron and Steel Institute. He is survived by a widow and two sons, one of whom, Mr. Brian L. Broadbent, succeeded his father as managing director of the company.

MR. DAVID ROSS, manager of the Malleable Tube Mills at Stockton for the last 18 years, has died at the age of 56.

MR. JAMES FERGUSON, who died a few days ago at Barrhead, Renfrewshire, aged 79, had long been a prominent figure in the West of Scotland chemical trade. He was for over 60 years connected with the Glasgow firm of Bryce & Rumpff, of which he had been a partner since 1905.

DR. PERCY LONGMUIR, M.B.E., who died at Sheffield on October 18, aged 66, was a founder member, and had been president of the Institute of British Foundrymen. He was well known as an expert on iron and steel, and had spent two years in the Metallurgical Department of Sheffield University as well as a short period at the National Physical Laboratory at Teddington. He was works manager of the Stocksbridge works of Samuel Fox and Company, Ltd., during the last war, after which he devoted himself exclusively to consulting work.

MR. HARRY WILLIAMS, A.I.C., who was laboratory assistant at Guy's Hospital under the late Sir Thomas Stephenson, Senior Scientific Analyst to the Home Office, and the great expert witness in poison trials, has died at Colchester, aged 65. Mr. Williams was for some years works chemist with A. Boake Roberts & Co., and then joined the research staff of Marks & Clerk, patent agents and engineers, where he investigated the utilisation of peat, spending some time in Denmark in that work. He went to Australia in 1919 as chief chemist to The Lanoleen Co., of Sydney, where he developed the production of lanoline and, by emulsification, incorporated it in sheep dips. About four years ago he returned to England, arriving in this country on the outbreak of war.

British Standards Institution

Annual General Meeting

AT the annual general meeting of the British Standards Institution, Sir Percy Ashley, K.B.E., C.B., accepted the invitation to remain as chairman of the General Council. Dr. E. F. Armstrong, F.R.S., formerly chairman of the Chemical Divisional Council, was co-opted as a permanent member of the General Council. The Chairman reported the recognition by H.M. Government of the Institution as the body for the issue of national standards with the exception of those issued by the Medical Research Council in the British Pharmacopœia and Codex.

Since the last meeting the Institution has published 160 new and revised standards, bringing the total issued to 1300. These include war emergency specifications prepared at the request of the Ministry of Aircraft Production, Board of Trade, Ministry of Home Security, and Ministry of Supply. British Standard Specifications are the result of the voluntary work of some 8000 representatives of most of the industrial and trade organisations in the country.

Ammonium Hydroxide

Preparation for Use in the Laboratory

IN a recent paper on the preparation of ammonium hydroxide for laboratory use (*J. Chem. Educ.*, 1942, *19*, 9, 419) an apparatus is described by Lloyd E. West and Arthur Wilson, of Oregon State College, in which a cooling arrangement shortens the time of preparation and avoids the use of a series of absorption bottles. A tank of liquid ammonia is connected by rubber tubing to a 40-litre carboy containing 25 litres of water. The 12-mm. glass tubing through which the ammonia is passed into the water is curved to conform somewhat with the curvature of the carboy. The end of the tube is about one inch from the bottom and one inch from the side of the carboy. The exit tube from the carboy is led into a tall hydrometer jar filled with water to which 5-10 drops of phenolphthalein have been added. The cooling device is a hollow iron ring, such as a circular gas burner, which has numerous small holes around its circumference. The ring is placed over the neck of the carboy and cold water is run through it so that water sprays evenly over the shoulders of the carboy. A few towels are wrapped around the carboy to increase the cooling efficiency yet further.

The carboy is set in a sink or near a drain and tap water is run through the cooling ring continuously. The valve on the ammonia tank is opened wide or just less than to where "bumping" in the carboy is objectionable. After about 16 hours of operation the volume of solution in the carboy has increased from 25 to approximately 40 litres. At about this time enough ammonia has passed into the hydrometer jar or tall cylinder, under a head of about 12 inches of water, to turn the phenolphthalein pink. The ammonia gas is then shut off and the specific gravity of the solution in the carboy is measured. A portion may be removed from the carboy, warmed to room temperature, and tested with a hydrometer. By rearranging the connections on the carboy the pressure from the ammonia cylinder may be used to start a siphon action.

If the hydroxide does not give the specific gravity usually desired, 0.9, the absorption is continued. During the final stages, the rate of flow of ammonia is reduced to minimise the loss of the gas from the carboy.

As a safety measure a water trap may be inserted between tank and carboy to prevent water from sucking back into the tank. However, the authors prefer to close the tank valve partially and pull off the rubber tubing at the tank simultaneously with shutting the valve on the nozzle.

Industrial Diseases

Points from the Factories' Report

THE Chief Inspector of Factories, in his report to the Minister of Labour and National Service for 1941, deals with certain diseases due to the materials handled in various processes. The number of cases of lead poisoning notified (59) was the lowest since notification became a statutory obligation. There were 41 cases of jaundice caused by the handling of T.N.T., and of these nine cases terminated fatally. Chlorinated naphthalene caused the death of a woman who was employed in scraping the wax from metal parts. There was one case of phosphorus poisoning, necrosis of the jaw, the only case seen in this country since 1919. There was an increase of nearly 200 cases and 10 deaths over the figures for 1940 from gassing accidents, but the cases of poisoning from nitrous fumes were somewhat less, 217 as compared with 236. Supervision of washing arrangements is strongly recommended as a major factor in the prevention of industrial dermatitis.

The bark of the sequoia, or redwood tree, is stated in the U.S.A. to provide material for hats and other articles. The Pacific Lumber Company working in conjunction with a woollen mill, has discovered, after more than ten years of research, that the short fibres of this bark can be blended with wool and spun into yarns suitable for making woven or knitted fabrics. Cloth that is neither spun or woven, but pressed like paper, is already in production.

Prices of British Chemical Products

THERE have been no changes of importance in the industrial chemicals market during the past week and most sections report a sustained demand. There has been a steady volume of inquiry for new business, although in several cases the supply position has restricted actual bookings. Contract deliveries to the main consuming industries continues to be on a satisfactory scale. In the soda products section a steady demand is reported for bicarbonate of soda and caustic soda, while there continues to be a fair inquiry circulating for hydrosulphite of soda. There is no improvement in the supply position of chlorate of soda and prices are firm. This also applies in the case of yellow prussiate of soda. A steady inquiry is reported for most of the potash products with yellow prussiate of potash and permanganate of potash in short supply. Conditions in the coal-tar products market remain unaltered with naphthalene and the xylols in fair demand, while carbolic acid and cresylic acid are in good request.

MANCHESTER.—Although there has been little actual change in the level of prices on the Manchester chemical market during the past week, the undertone is steady to firm throughout the range, and a reasonably good demand for most classes of material, chiefly against contracts, is being met with. Lancashire and Yorkshire requirements in dyeing, finishing and other textile chemicals keep at a fairly satisfactory level, while leather trade chemicals are in steady request. The tar products market is firm generally, with the light materials, especially, in good demand. Among the heavy products pitch is more active than it was a short time ago, while crude tar, creosote, and carbolic acid are moving briskly into consumption.

GLASGOW.—In the Scottish heavy chemical trade there has been a slight improvement during the past week for home business. Export inquiries and trade are rather limited. Prices remain very firm. In a few instances there has been a slight advance.

Price Changes

Rises: Aluminium sulphate; citric acid; formaldehyde; litharge; mercury products; naphtha (Manchester); pitch (Manchester); potash, caustic (liquid); soda, caustic; sodium acetate; sodium bisulphite; sodium prussiate; sulphur.

Falls: Disodium phosphate.

General Chemicals

Acetic Acid.—Maximum prices per ton: 80% technical, 1 ton £39 10s.; 10 cwt./1 ton, £40 10s., 4/10 cwt., £41 10s.; 80% pure, 1 ton, £41 10s.; 10 cwt./1 ton, £42 10s.; 4/10 cwt., £43 10s.; commercial glacial, 1 ton, £49; 10 cwt./1 ton, £50; 4/10 cwt., £51; delivered buyers' premises in returnable barrels, £4 10s. per ton extra if packed and delivered in glass.

Acetone.—Maximum prices per ton, 50 tons and over, £65; 10/50 tons, £65 10s.; 5/10 tons, £66; 1/5 tons, £66 10s.; single drums, £67 10s.; delivered buyers' premises in returnable drums or other containers having a capacity of not less than 45 gallons each. For delivery in non-returnable containers of 40/50 gallons, the maximum prices are £3 per ton higher. Deliveries of less than 10 gallons free from price control.

Alum.—Loose lump, £14 10s. per ton, f.o.b.

Aluminium Sulphate.—£10 15s. to £11 5s. per ton d/d.

Ammonia Anhydrous.—1s. 9d. to 2s. 3d. per lb.

Ammonium Carbonate.—£37 10s. per ton d/d in 5 cwt. casks.

Ammonium Chloride.—Grey galvanising £22 10s. per ton, in casks, ex wharf. Fine white 98%, £19 10s. per ton. See also Salammoniac.

Antimony Oxide.—£111 to £117 per ton.

Arsenic.—For 1-ton lots, £41 to £46 per ton, according to quality, ex store; for 20-ton lots; £35 to £40 per ton d/d. Intermediate prices for intervening quantities.

Barium Chloride.—98/100%, prime white crystals, £16 10s. to £19 10s. per ton, bag packing, ex works; imported material would be dearer.

Bleaching Powder.—Spot, 35/37%, £11 to £11 10s. per ton in casks, special terms for contract.

Borax, Commercial.—Granulated, £31 10s.; crystals, £32 10s.; powdered, £33; extra fine powder, £34; B.P. crystals £40 10s.; powdered, £41; extra fine, £42 per ton for ton-lots, in free 1-cwt. bags, carriage paid in Great Britain. Borax Glass, lump, £83; powder, £84 per ton in tin-lined cases for home trade only, packages free, carriage paid.

Boric Acid.—Commercial, granulated, £52 15s.; crystals, £53 15s.; powdered, £54 15s.; extra fine powder, £56 15s.; B.P. crystals, £61 15s.; powdered, £62 15s.; extra fine powdered, £64 15s. per ton for ton lots in free 1-cwt. bags, carriage paid in Great Britain.

Calcium Bisulphite.—£6 10s. to £7 10s. per ton f.o.r. London.

Calcium Chloride.—70/72% solid, £5 15s. per ton, ex store.

Charcoal, Lump.—£10 10s. to £14 per ton, ex wharf. Granulated, supplies scarce.

Chlorine, Liquid.—£23 per ton, d/d in 16/17 cwt. drums (3-drum lots).

Chrometan.—Crystals, 5½d. per lb.

Chromic Acid.—1s. 5d. per lb., less 2½%, d/d U.K.

Citric Acid.—Controlled prices per lb., d/d buyers' premises. For 5 cwt. or over, anhydrous, 1s. 6¾d., other, 1s. 5d.; 1 to 5 cwt., anhydrous, 1s. 9d., other, 1s. 7d. Higher prices for smaller quantities.

Copper Oxide.—Black, £95 per ton.

Copper Sulphate.—£31 5s. per ton, f.o.b., less 2 per cent. in 2 cwt. bags.

Cream of Tartar.—100%, £18 12s. per cwt., less 2½%, d/d in sellers' returnable casks.

Formaldehyde.—£24 10s. to £26 per ton in casks, according to quantity, d/d. MANCHESTER: 40%, £24 10s. to £26 10s. per ton in casks, according to quantity, d/d.

Formic Acid.—85%, £47 per ton for ton lots, carriage paid; smaller parcels quoted up to 50s. per cwt., ex store.

Glycerine.—Chemically pure, double distilled 1260 s.g., in tins, £4 to £5 per cwt., according to quantity; in drums, £3 14s. 6d. Refined pale straw industrial, 5s. per cwt. less than chemically pure.

Hexamine.—Technical grade for commercial purposes, about 1s. 4d. per lb.; free-running crystals are quoted at 2s. 1d. to 2s. 3d. per lb.; carriage paid for bulk lots.

Hydrochloric Acid.—Spot, 6s. 5½d. to 8s. 11d. per carboy d/d according to purity, strength and locality.

Hydrofluoric Acid.—59/60%, about 1s. to 1s. 2d. per lb.

Iodine.—Resublimed B.P., 10s. 4d. to 14s. 6d. per lb., according to quantity.

Lactic Acid.—Dark tech., 50% by vol., £40 10s. per ton. Not less than one ton lots ex works; barrels returnable, carriage paid.

Lead Acetate.—White, 51s. to 54s. per cwt. MANCHESTER: £51 to £54 per ton.

Lead Nitrate.—About £47 per ton d/d in casks.

Lead, Red.—English, 5/10 cwt., £45 per ton; 10 cwt. to 1 ton, £44 15s.; 1/2 tons, £44 10s.; 2/5 tons, £44; 5/20 tons, £43 10s.; 20/100 tons, £43; over 100 tons, £42 10s. per ton, less 2½%, carriage paid, non-setting red lead, 10s. per ton dearer in each case.

Lead, White.—Dry English, less than 5 tons, £55 10s.; 5/15 tons, £51 10s.; 15/25 tons, £51; 25/50 tons, £50 10s.; 50/200 tons, £50 per ton, less 5 per cent. carriage paid; Continental material, £1 per ton cheaper. Ground in oil, English, 1/5 cwt., £67; 5/10 cwt., £66; 10 cwt. to 1 ton, £65 10s.; 1/2 tons, £64; 2/5 tons, £63; 5/10 tons, £61; 10/15 tons, £60; 15/25 tons, £59; 50/100 tons, £58 10s. per ton, less 5% carriage paid.

Litharge.—1 to 2 tons, £44 10s. per ton.

Lithium Carbonate.—7s. 9d. per lb. net.

Magnesite.—Calcined, in bags, ex works, £18 15s. to £22 15s. per ton.

Magnesium Chloride.—Solid (ex wharf), £14 to £18 per ton. MANCHESTER: £14 to £16 per ton.

Magnesium Sulphate.—Commercial, £12 to £14 per ton, according to quality, ex works.

Mercury Products.—Controlled price for 1 cwt. quantities: Bichloride powder, 15s. 8d.; bichloride lump, 16s. 3d.; ammon. chloride powder, 17s. 10d., ammon. chloride lump, 17s. 8d.; mercurous chloride, 18s. 7d.; mercury oxide, red cryst, 20s. 9d.; red levig., 20s. 3d.; red tech., 19s. 11d.; yellow levig., 20s. 2d.; yellow tech., 19s. 7d.; sulphide, red, 17s. 9d.

Methylated Spirit.—Industrial 66° O.P. 100 gals., 2s. 4d. per gal.; pyridinised 64° O.P. 100 gals., 2s. 5d. per gal.

Nitric Acid.—£24 to £26 per ton, ex works.

Oxalic Acid.—£60 to £65 per ton for ton lots, carriage paid, in 5-cwt. casks; smaller parcels would be dearer; deliveries slow.

Paraffin Wax.—Nominal.

Potash, Caustic.—Basic price for 50-100 ton lots. Solid, 88/92%, commercial grade, £53 7s. 6d. per ton, c.i.f. U.K. port, duty paid. Broken, £5 extra; flake, £7 10s. extra; powder, £10 extra per ton. Ex store, £3 10s. supplement. Liquid, d/d, £32, in lots of 1 ton.

Potassium Bichromate.—Crystals and granular, 7½d. per lb.; ground, 8½d. per lb., for not less than 6 cwt.; 1-cwt. lots, ¼d. per lb. extra.

Potassium Carbonate.—Basic prices for 50 to 100 ton lots; calcined, 98/100%, £52 10s. per ton, c.i.f. U.K. port. Ex warehouse, £55 5s. per ton.

Potassium Chlorate.—Imported powder and crystals, nominal.

Potassium Iodide.—B.P., 8s. 8d. to 12s. per lb., according to quantity.

Potassium Nitrate.—Small granular crystals, £40 to £45 per ton ex store, according to quantity.

Potassium Permanganate.—B.P., 1s. 10d. per lb. for 1 cwt. lots; for 3 cwt. and upwards, 1s. 9½d. per lb.; technical, £7 18s. 6d. to £8 10s. 6d. per cwt., according to quantity d/d.

Potassium Prussiate.—Yellow, 5 cwt. to 7 cwt., casks, 1s. 6d. per lb., d/d; supplies scarce.

Salammoniac.—First lump, spot, £48 per ton; dog-tooth crystals, £50 per ton; medium, £48 10s. per ton; fine white crystals, £19 10s. per ton, in casks, ex store.

Soda, Caustic. — Solid 76/77%; spot, £16 7s. 6d. per ton d/d station.

Sodium, Acetate.—£41 per ton, ex wharf.

Sodium Bicarbonate (refined).—Spot, £11 per ton, in bags.

Sodium Bichromate.—Crystals, cake and powder, 5½d. per lb., anhydrous, 6d. per lb., net d/d U.K.

Sodium Bisulphite Powder.—60/62%, £19 10s. per ton d/d in 2-ton lots for home trade.

Sodium Carbonate Monohydrate.—£21 per ton d/d in minimum ton lots in 2 cwt. free bags.

Sodium Chlorate.—£36 to £45 per ton, d/d, according to quantity.

Sodium Hyposulphite.—Pea crystals, £20 per ton for 2-ton lots; commercial, £15 per ton; photographic, £22 per ton.

Sodium Iodide.—B.P., for not less than 28 lb., 9s. 6d. per lb., for not less than 7 lb., 13s. 1d. per lb.

Sodium Metasilicate.—£16 per ton, d/d U.K. in 1-ton lots.

Sodium Nitrate.—Refined, £15 5s. per ton for 6-ton lots d/d.

Sodium Nitrite.—£21 to £23 per ton for ton lots.

Sodium Percarbonate.—21½% available oxygen, £7 per cwt.

Sodium Phosphate.—Di-sodium, £20 to £25 per ton d/d for ton lots. Tri-sodium, £26 to £30 per ton d/d for ton lots.

Sodium Prussiate.—8½d. to 9½d. per lb. ex store.

Sodium Silicate.—£9 10s. to £10 12s. 6d. per ton, for 4-ton lots.

Sodium Sulphate (Glauber Salts).—£4 10s. ton d/d.

Sodium Sulphate (Salt Cake).—Unground. Spot £4 11s. per ton d/d station in bulk. MANCHESTER: £4 15s. per ton d/d station.

Sodium Sulphide. — Solid, 60/62%, spot, £17 15s. per ton, d/d, in drums; crystals, 30/32%, £12 7s. 6d. per ton, d/d, in casks.

Sodium Sulphite.—Anhydrous, £29 10s. per ton; pea crystals, spot, £20 10s. per ton d/d station in kegs; commercial, £12 to £14 per ton d/d station in bags.

Sulphur.—For quantities not less than 4 tons, unground, unsieved and ungraded, £14 10s. per ton, ex store. Ground and sieved, £16 15s. per ton, ex store, according to mesh. Controlled prices.

Sulphuric Acid.—168° Tw., £6 10s. to £7 10s. per ton; 140° Tw., arsenic-free, £4 11s. per ton; 140° Tw., arsenious, £4 3s. 6d. per ton. Quotations naked at sellers' works.

Tartaric Acid.—4s. 4d. per lb., less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 4s. 4d. per lb.

Tin Oxide.—Snow white, 305s.-315s. per cwt.

Zinc Oxide.—Maximum prices: White seal, £30 17s. 6d. per ton; red seal, £28 7s. 6d. d/d; green seal, £29 17s. 6d. d/d.

Zinc Sulphate.—Tech., £20-£21 per ton, carriage paid, casks free.

Rubber Chemicals

Antimony Sulphide.—Golden, 1s. 2d. to 2s. 1½d. per lb. Crimson, 2s. 2d. to 2s. 6d. per lb.

Arsenic Sulphide.—Yellow, 1s. 9d. per lb.

Barytes.—Best white bleached, £8 3s. 6d. per ton.

Cadmium Sulphide.—6s. to 6s. 6d. per lb.

Carbon Black.—6d. to 8d. per lb., according to packing.

Carbon Bisulphide.—£34 per ton, according to quality, in free returnable drums.

Carbon Tetrachloride.—£46 to £49 per ton.

Chromium Oxide.—Green, 2s. per lb.

India-rubber Substitutes. White, 6 3/16d. to 10½d. per lb.; dark, 6 3/16d. to 6 15/16d. per lb.

Lithopone.—30%, £25 per ton; 60%, £31 to £32 per ton. Imported material would be dearer.

Mineral Black.—£7 10s. to £10 per ton.

Mineral Rubber, "Rupron."—£20 per ton.

Sulphur Chloride.—7d. per lb.

Vegetable Lamp Black.—£49 per ton.

Vermilion.—Pale or deep, 15s. 6d. per lb. for 7-lb. lots.

Plus 5% War Charge.

Nitrogen Fertilisers

Ammonium Phosphate Fertilisers.—Type B. See Concentrated Fertilisers.

Ammonium Sulphate.—Per ton in 6-ton lots, d/d farmer's nearest station, August, £9 10s.; increased charge of 1s. 6d. per month up to March, 1943.

Calcium Cyanamide.—Nominal; supplies very scanty.

Concentrated Fertilisers.—Per ton in 6-ton lots d/d farmer's nearest station, in August: I.C.I. Type, "Special III," £14 9s. 6d.; Type "B," £14 1s. 3d.; Type "C," £17 19s. Increased charge of 1s. 6d. per month up to March, 1943.

"Nitro Chalk."—£9 14s. per ton in 6-ton lots, d/d farmer's nearest station.

Sodium Nitrate.—Chilean super-refined for 6-ton lots d/d nearest station, £15 5s. per ton; granulated, over 98%, £14 10s. per ton. Surcharges for smaller quantities unless collected at warehouse or depots.

Coal Tar Products

Benzol.—Crude, 60's, 1s. 10d.; pure 2s. 6d., per gal., ex works.

Carbolic Acid.—Crystals, 10d. to 11d. per lb. Crude, 60's, 4s. 3d. to 4s. 6d., according to specification. MANCHESTER: Crystals, 9¾d. to 11½d. per lb., d/d; crude, 4s. to 4s. 6d., naked, at works.

Creosote.—Home trade, 6½d. per gal., f.o.r., maker's works; exports, 6d. to 6¼d. per gal., according to grade. MANCHESTER: 6½d. to 9d. per gal.

Cresylic Acid.—Pale, 97%, 3s. 6d. per gal.; 99%, 4s. 2d.; 99.5/100%, 4s. 6d. MANCHESTER: Pale, 99/100%, 4s. 6d. per gal.

Naphtha.—Solvent, 90/160°, 2s. 2d. to 2s. 6d per gal.; heavy, 90/190°, 1s. 10d., naked at works. MANCHESTER: 90/160°, 2s. 1d. to 2s. 4d. per gal.

Naphthalene.—Crude, in 4-ton lots, in sellers' bags, £5 9s. to £8 9s. per ton, according to m.p. In sellers' bags, 2s. ton lots; hot-pressed, £10 5s. per ton; purified crystals, £19 to £35 per ton. Controlled prices.

Pitch.—Medium, soft, 45s. to 55s. per ton, f.o.b. MANCHESTER: 47s. 6d. per ton at works.

Pyridine.—90/140°, 18s. per gal.; 90/160°, 13s. to 14s. MANCHESTER: 14s. to 18s. 6d. per gal.

Toluol.—Pure, 2s. 5d. nominal; 90's, 1s. 10d. per gal. MANCHESTER: Pure, 2s. 5d. per gal. naked.

Xylol.—Commercial, 3s. 1d. to 3s. 5½d. per gal.; pure, 3s. 2½d. to 3s. 7d. MANCHESTER: 2s. 8d. to 3s. 1d.

Wood Distillation Products

Calcium Acetate.—Brown, £21 per ton; grey, £24. MANCHESTER: Grey, £25 per ton.

Methyl Acetone.—40/50%, £56 per ton.

Wood Creosote.—Unrefined, about 2s. per gal., according to boiling range.

Wood Naphtha, Miscible.—4s. 6d. to 5s. 6d. per gal.; solvent, 5s. 6d. per gal.

Wood Tar.—£5 per ton.

Intermediates and Dyes (Prices Nominal)

m-**Cresol** 98/100% —Nominal.

o-**Cresol** 30/31° C.—Nominal.

p-**Cresol** 34/35° C.—Nominal.

Dichloraniline.—2s. 8½d. per lb.

Dinitrobenzene.—8½d. per lb.

Dinitrotoluene.—48/50° C., 9½d. per lb; 66/68° C., 1s.

p-**Nitraniline.**—2s. 5d. per lb.

Nitrobenzene.—Spot, 5½d. per lb. in 90-gal. drums, drums extra, 1-ton lots d/d buyer's works.

Nitronaphthalene.—1s. 2d. per lb.; P.G., 1s. 0½d. per lb.

o-**Toluidine.**—1s. per lb., in 8/10 cwt. drums, drums extra.

p **Toluidine.**—2s. 2d. per lb., in casks.

m-**Xylidine Acetate.**—4s. 5d. per lb., 100%.

Latest Oil Prices

LONDON.—October 28.—For the period ending October 31, per ton, net, naked, ex mill, works or refinery, and subject to additional charges according to package and location of supplies: LINSEED OIL, crude, £46 10s. RAPESEED OIL, crude, £48 5s. COTTONSEED OIL, crude, £39 12s. 6d.; washed, £42 15s.; refined edible, £48; refined, deodorised, £49. COCONUT OIL, crude, £36 12s. 6d.; refined deodorised, £40. PALM KERNEL OIL, crude, £36; refined deodorised, £40; refined hardened deodorised, £44. PALM OIL, refined deodorised, £46; refined hardened deodorised, £49. GROUNDNUT OIL, crude, £44; neutralised and bleached, £48; refined hardened deodorised, £53 to £54. WHALE OIL, crude hardened, 42 deg., £39; refined hardened, 42 deg., £42. ACID OILS—Groundnut, £27 10s.; soya, £25 10s.; coconut and palm-kernel, £31. ROSIN, 26s. 6d. to 33s. per cwt., ex wharf, according to grade. TURPENTINE, American, 87s. per cwt. in drums or barrels, as imported (controlled price).

General News

From Week to Week

Mr. Ernest Brown, Minister of Health, stated in the House of Commons that there was no scientific evidence that saccharine or saxin tablets were injurious to health.

A new design in asbestos suits is being applied to the fighting and civil defence services for use when dealing with the latest type of incendiary bomb.

Workers in non-ferrous metals are to be shown the vital purposes to which many of their products are applied in the waging of war. A mobile exhibition, the first of two, has been arranged and will visit hundreds of factories.

Among industries likely to be hit by the new call-up of men under 25 to military service, are the rubber industry and various branches of glass manufacture. Iron and steel moulders and pig-iron manufacturers will also be affected.

The Faraday Medal of the Institution of Electrical Engineers was presented on Tuesday last, says Reuter, to Professor Peter Kapitza, the eminent Russian physicist, who formerly worked with distinction at the Cavendish Laboratory, Cambridge.

Charts of the stains for the detection of toxic gases are being reprinted for the D.S.I.R., and the following numbers are now available from H.M. Stationery Office, or through any bookseller, at the revised price of 1s. 6d. each: (3) Sulphur Dioxide, (7) Carbon Monoxide, (8) Phosgene, and (9) Arsine.

A new Order controlling the canning of food comes into operation on November 15. Licensing is instituted in the trade; canners must comply with the Minister of Food's requirements as to processes and materials; and laboratory control of both raw material and finished packs, either in the factory or by regular expert examination, is compulsory.

Students of chemical engineering are reminded that they can now obtain application forms for the Inst. Chem. Eng. associate-membership examination (1943) on application to the Hon. Registrar, Institution of Chemical Engineers, 56 Victoria Street, London, S.W.1. The memorandum on "The Training of a Chemical Engineer" is also available.

According to Professor J. C. Drummond, Scientific Adviser to the Ministry of Food, it has been demonstrated that the bulk of the vitamin-B 1 content of the wheat berry lies in the skin separating the germ from the rest of the berry. Millers are now able to incorporate a large part of this in the "national" flour, giving it a high content of vitamin B 1.

A large canteen was opened recently at the Monsanto Works, Cefn, Ruabon, North Wales, by Mr. Robert Richards, M.P., Regional Commissioner for Civil Defence in Wales.

The Secretary of The Institution of Gas Engineers announces that copies of this year's Research Communications and of the Reports of the Gas Research Board are obtainable by non-members who apply to him at 1 Grosvenor Gardens, S.W.1. A special application form must first be obtained.

Details have been published of the Minister of War Transport's scheme for the conversion of a number of commercial road vehicles to producer gas. This follows a similar plan for the equipment of public service vehicles with producer gas units. Of the 7000 plants to be manufactured, 6000 will go to commercial vehicles and the remainder to Service and Government-owned vehicles.

Continuing their policy of issuing a small range of seasonal colours for the wool and worsted trades, the Dyers' and Finishers' Association of the West Riding of Yorkshire sponsor "Highway Colours" for Spring and Summer, 1943, in co-operation with the British Colour Council. Although the number of colours is again reduced, a choice of nine colours still gives plenty of variety, and care has been taken to ensure that all colours used in the home trade come well within the limits laid down by the Dyestuffs Controller.

The Ministry of Supply announces that a quantity of pharmaceutical products imported from the United States under the Lease-Lend arrangement will shortly be available for distribution. The names of the products and the prices at which they will be sold are obtainable from the British Chemical and Dyestuffs Traders' Association, Ltd., which has been appointed agent for the Ministry for distribution purposes. Users and processors who previously bought any of these products for the purpose of their business and who now require supplies, should apply through the usual trade channels and *not* to the association.

Foreign News

A new methane-producing company, the Samet (S. A. Meridionale Metano), has been established at Naples, Italy.

Chinese refugees from the phosphate workings on Ocean Island and Nauru are now employed in the newly-expanded wolfram mines in Australia, and are working most efficiently, according to Australian Press reports. Under a special agreement, they receive a daily allotment of vegetables, meat, and rice.

The Portuguese Government has given a French firm a concession to build a plant at Oporto, the first of its kind in the country, to produce tin plate and galvanised iron.

The United States Department of Agriculture now has enough fish oil to provide vitamin A for 9,000,000 Allied troops and civilians for a year.

Under the direction of Hungaria Chemischen und Hüttenwerke A.-G., Budapest, the Bulgarian Rhodopski Metal A.-G. has been established to develop the rich lead and zinc deposits of Bulgaria.

A new Swiss company, " Inol " (Industria degli Olii Minerali), has been formed to exploit the shale-oil deposits of San Giorgio, Melide (Ticino), according to local Press reports.

The development and manufacture of a plastic, entitled " Kanex," made from sugar-cane bagasse, has been suggested as a means of reviving the depressed " sugar belt " of Louisiana, U.S.A.

At a meeting of the Bolivian Mining Congress—the first since 1938—approval has been given to the co-ordination of mining production to provide the democracies with raw materials.

The discovery of vanadium oxide in Ceylon has been reported by the Government mineralogist there. It is expected that many thousands of tons of vanadium may in consequence become available. Meanwhile, a report on the samples from Indian steel firms is awaited.

The Croatian Aluminium Company, recently founded with a capital of 20 million Kr., proposes to erect works for the production of aluminium and aluminium goods. The board consists of State representatives, of Croatian industrials, and of delegates of the Vereinigte Aluminium Werke, Berlin.

For the production of chemicals in Bulgaria, especially of saccharin, the Chemische A.-G. of Vienna is opening a branch factory in Sofia. The erection of artificial manure factories has also been put in hand, and in connection with this the State coal mines will establish a sulphuric acid plant at Parnik.

Physical properties of rubber can be improved by the incorporation of diphenyl, according to a U.S. patent assigned to the Monsanto Chemical Company. Only from 0.5 to 3 parts by weight of the diphenyl is required to improve the resistance of the rubber and its lasting properties.

Copper slag from the Norddeutsche Affinerie, Hamburg, formerly regarded as a waste product has been tried as a fertiliser. The material consists largely of silica and iron and contains 0.413 per cent. of copper as well as traces of metallic impurities. About 18 cwt. of copper slag are recommended instead of 1 cwt. of $CuSO_4.H_2O$ for use on soils deficient in copper.

Atlas Plaster of Paris Industries (Pty.), Ltd., have now completed their new building at Germiston, Transvaal. The company supplies plaster of paris, kieselguhr, oxides, barytes, fullers' earth, kaolin, and chalk for local and oversea markets.

Methods of treating wood by which it can be made as resistant as armour plate, or as resilient as rubber, have been evolved in the United States and are to be developed in Canada. The formula of Dr. M. Wladaver, of New York, which is for treating either hard or soft woods, has been approved by his Government, and he is now in Ottawa discussing plans to open a plant, probably in the dense forests near the St. Lawrence.

Forthcoming Events

A meeting of the London Section of the **Society of Chemical Industry** will be held jointly with the Plastics Group and the **Oil and Colour Chemists' Association,** at 2.30 p.m., on **November 2,** in the Chemical Society's rooms, Burlington House, W.1. A lecture on " Heat Resisting and Stoving Finishes " will be given by Mr. R. L. Frost.

A meeting of the Midlands Centre of the **Electrodepositors' Technical Society** will be held at the James Watt Memorial Institute, Great Charles Street, Birmingham, at 4.30 p.m., on **November 3.** Mr. L. S. Larkin will present a paper on " The Determination of Thickness of Deposits by Specific Gravity."

The first meeting of the Agriculture Group of the **Society of Chemical Industry** will be held jointly with the Food Group in the Lecture Hall of the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, at 2.30 p.m. on **November 3.** Dr. G. H. Bates will give a lecture on " The Increasing Food Output of Great Britain."

There will be a meeting of the Road and Building Materials Group of the **Society of Chemical Industry,** at 4 p.m., on **November 4,** at Gas Industry House, Grosvenor Place, W.1. Mr. R. K. Schofield will speak on " The Rôle of Moisture in Soil Mechanics."

A joint meeting of the **Institution of Electrical Engineers** and the **Institution of Mechanical Engineers** will be held in the Lecture Theatre of the I.E.E., Victoria Embankment, W.C.2, on **November 5,** at 5.30 p.m., when Mr. J. N. Waite, of the Central Electricity Board, will read a paper entitled " Coal for Steam Raising."

The annual general meeting of the Leeds area section of the **Institute of Chemistry** will be held, at 6.30 p.m., on **November 9,** at the University, Leeds. Dr. J. J. Fox will open a discussion on " Policy and the Chemist."

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BRITISH CELANESE, LTD., Torquay. (M., 31/10/42.) October 10, £24,000 and £27,000 debenture stock, parts of an amount already registered. *£2,786,481. December 31, 1941.

Satisfaction

SALAMON AND CO., LTD. Rainham, Essex, chemical manufacturers. (M.S., 31/10/42.) Satisfaction October 5, £5000, registered January 7, 1930.

Company Winding-Up

LUNALITE, LTD. (C.W.U., 31/10/42.) Winding-up order, October 12.

Receiver Ceasing to Act

ASTRON MANUFACTURING CO., LTD., Ingatestone, manufactuing chemists. (R.C.A., 31/10/42.) E. C. Cleave. September 25.

Company News

Greeff-Chemicals Holdings, Ltd., announce an interim dividend of 3 per cent. (same).

Steel Barrel, Scamells and Associated Engineering, Ltd., announce a dividend of 9 per cent. and a bonus of 5 per cent., making 20 per cent. for the year (15 per cent.).

Villa Laboratories, Ltd., 78/80 Boundary Lane, Liverpool, have increased their nominal capital beyond the registered capital of £2000 by the addition of £2000, divided into 2000 5 per cent. preference shares of £1 each.

Borax Consolidated, Ltd., are paying on December 3, an interim dividend of 3 per cent., less income tax, on the preferred ordinary stock, for the year ended September 30 (same).

Murex, Ltd., have declared a trading profit, for the year ended June 30, of £598,707 (£553,091), and a dividend on the ordinary shares of 20 per cent. (same), including a bonus of 2½ per cent.

Erinoid, Ltd., have again declared an ordinary dividend of 10 per cent. for the year ended July 31. Trading profits are £106,605 (£76,316), but the net profit is £25,526, against £42,457, owing to a rise in tax charge from £19,338 to £66,387.

British Alkaloids, Ltd., have declared an interim dividend of 12½ per cent. (12 per cent.).

In view of representations made by interested parties, the Board of **British Celanese, Ltd.,** has decided to amend the scheme for the satisfaction of the arrears of dividend on the second preference shares, as announced in our issue of October 17. Interest on the new funding certificates will be increased from 4 per cent. to 5 per cent., with the object of removing any doubt as to the initial market value of the funding certificates.

New Companies Registered

Synco Chemical Manufacturing Co., Ltd. (376,689).—Private company. Capital: £500 in 500 shares of £1 each. Manufacturers of and wholesale and retail dealers in chemical products, oil, waxes, drugs, tar products, fertilisers, etc. Subscribers: Kathleen L. Spring, V. R. Ings, 127 Farmilo Road, E.10. Solicitors: Tarlo, Lyons and Co., 26 Martin Lane, E.C.4.

Transandean Equities, Ltd. (376,773).—Private company. Capital: £1000 in 500 ordinary and 500 non-cumulative participating preference shares of £1 each. Objects: To acquire properties or rights in the Republic of Colombia or elsewhere in South America, to manage and develop mineral and oil deposits, agricultural, animal and chemical products, vegetation, etc. Directors: J. W. Stanton, K. E. Westman. Registered office: 35 Spring Gardens, S.W.1.

Chemical and Allied Stocks and Shares

STOCK EXCHANGE markets have shown a steady undertone, but were less active in view of an attitude of caution, the tendency being to await news as to the progress of the war in Egypt. Industrial securities maintained recent gains fairly well and showed individual features of interest, while British Funds were well maintained. At 35s. 7½d. Imperial Chemical were within 1¼d. of the level ruling a week ago, and the 7 per cent. preference were higher at 34s. 3d. B. Laporte remained around 70s. on the interim dividend, and Lever & Unilever were 30s. 6d., a decline of 3d. on balance. Borax Consolidated were unchanged at 34s., while British Aluminium further improved from 47s. 9d. to 48s. 4½d., although at the time of writing British Oxygen have eased slightly to 73s. 3d. After an earlier reaction, United Molasses rallied to 30s. 3d. aided by the maintenance of the interim dividend at 7½ per cent.

Financial results are continuing to show that in cases where earnings have improved

a conservative policy is being followed and dividends are unchanged. It will be recalled that last week Wall Paper Manufacturers announced that the dividend was again limited to 4 per cent. and as much as £100,000 being placed to a special reserve. Murex, Ltd., has now been able to show a good increase in profit, but the distribution on the shares is kept at 20 per cent. and a larger sum placed to reserve funds; in his statement the chairman indicates that a conservative policy is being followed owing to the difficulties and uncertainties of the post-war period. At the time of writing, Murex shares have moved up to 96s. 3d. and have remained firmly held. Wall Paper deferred units rallied from 29s. 3d. to 30s. 3d., while in other directions Turner & Newall had a firmer appearance at 75s., as had Triplex Glass at 29s. 4d. Moreover, British Plaster Board were higher at 27s. 6d., and Associated Cement have improved to 50s. 7½d. Awaiting the dividend announcement, Tube Investments were firm at 89s. 6d.; Stewarts & Lloyds were steady at 49s. 10½d., as were United Steel at 24s. 9d., Guest Keen at 28s. 9d., and Staveley at 50s. Richard Thomas 6s. 8d. ordinary remained active and showed further improvement to 8s. 6d., while Allied Ironfounders made the higher price of 37s. Birmid Industries moved up to 72s., and Amalgamated Metal shares to 15s.

Where changed, shares of companies connected with plastics were slightly lower. Erinoid 5s. ordinary were 9s. 9d. following publication of the results. The latter show higher earnings, but the increase is more than offset by provision for taxation, and as previously announced, the dividend is unchanged at 10 per cent. The chairman points out that so long as E.P.T. is in operation, profits and dividends will be limited. Business around 4s. 3d. was recorded in British Industrial Plastics 2s. shares, and around 4s. 1½d. in Lacrinoid Products. In other directions, British Celanese were active in advance of the meeting called to consider the proposed scheme for dealing with second preference dividend arrears, which will have been held by the time these notes are read. Courtaulds were firm around 41s. 6d. and Calico Printers were inclined to improve.

Greeff-Chemicals 5s. ordinary units changed hands at 5s. 6d. at one time, and Blythe Colour shares at 6s. 1½d. There was again a fair number of dealing in Goodlass Wall 10s. ordinary, which ranged up to close on 12s. 6d. At 20s. the quotation for British Drug Houses was unchanged, while Monsanto Chemicals 5½ per cent. preference were again 22s. 6d., and Lawes Chemical 8s. 9d. Firmness was shown by Boots Drug at 38s. 3d., and Timothy Whites were higher at 23s. 4½d. Among other securities, Imperial Smelting improved to 12s. 9d. Although higher on balance, the tendency in oil shares had become easier at the time of writing, sentiment being influenced by the disposition to await the trend of war developments in Egypt.

New Control Orders

Pyrethrum Products

The Minister of Supply has made the Control of Pyrethrum (No. 1) Order, 1942, under which dealings in and the treatment and consumption of pyrethrum flowerheads, and products manufactured therefrom, are made subject to licence. Licences will normally be issued for the acquisition of flowerheads and for the disposal of the products manufactured therefrom. In the case of manufactured products, the Control covers only disposals by, and acquisitions from, persons who are actual producers in the United Kingdom. Applications for licences should be made to the Ministry of Supply (R.M.D.), Warwick. The Order (S. R. & O. 1942, No. 2151) came into force on October 26.

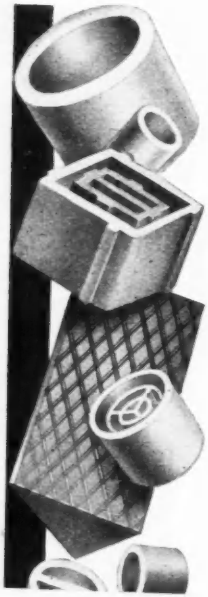
LATIN-AMERICAN NOTES

Exports of chemicals from Canada to the Republic of Haiti have risen sharply in recent months, while exports of copper and alloys have also increased considerably since the early days of the war.

A new company, the Cia Brasileira de Cobre, is reported to have been formed in Porto Algre, Brazil, for the exploitation of copper deposits in Rio Grande do Sul and for the manufacture of the metal obtained. The capital is provided by the State Gavernment and a local company, the latter to work some of the copper extracted.

On Monday next the " cruzeiro " replaces the milreis as the unit of Brazilian currency. As the cruzeiro and the milreis are of the same value, the only difference is in the subdivision, 100 centavos to the cruzeiro taking the place of 1000 reis to the milreis. Brazil is thus taking the same step as the mother country, Portugal, took some 30 years ago, when the escudo replaced the Portuguese milreis.

The Brazilian Government has approved a loan to be granted by the Agricultural and Industrial Credit Department of the Banco do Brasil to enable a national chemical concern to purchase additional machinery in the U.S.A. for the production of citric acid. The present quota allowed to Brazil by the U.S.A. to replace imports from Europe (mainly Italy) is quite insufficient to meet normal requirements.



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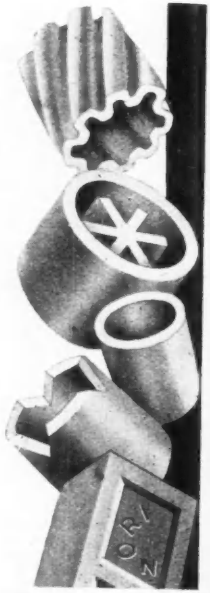

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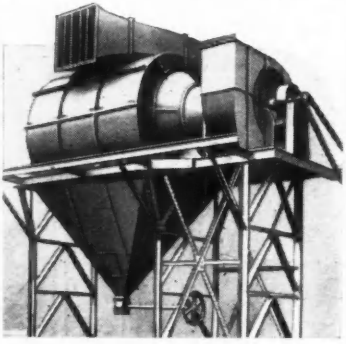

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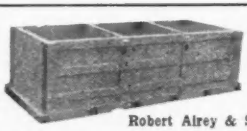

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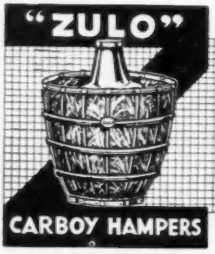

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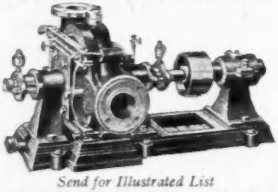

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